



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 18, 2023 – 12:07 PM JST

PDB ID : 8HZ2
Title : Tumor Necrosis Factor Receptor Associated Factor 6 (TRAF6) N-terminal Domain
Authors : Guven, O.; Ciftci, H.; DeMirici, H.
Deposited on : 2023-01-07
Resolution : 2.60 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.31.3
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.3

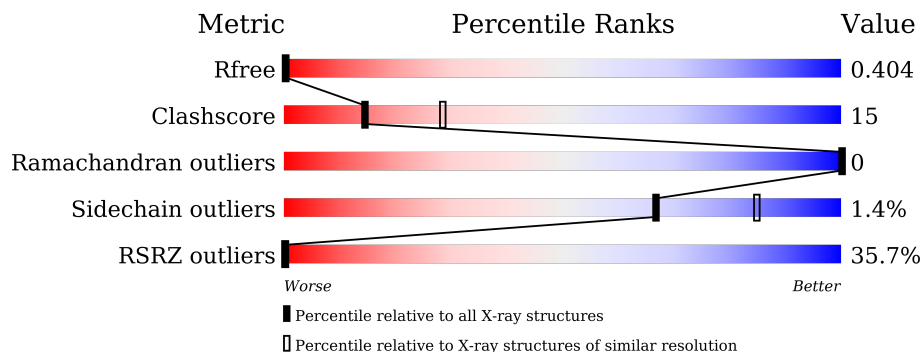
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	157	
1	B	157	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 2574 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called TNF receptor-associated factor 6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	157	1259	785	225	229	20	0	0	0
1	B	157	1259	785	225	229	20	0	0	0

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	5	Total	Zn	5	0
			5	5		
2	B	5	Total	Zn	5	0
			5	5		

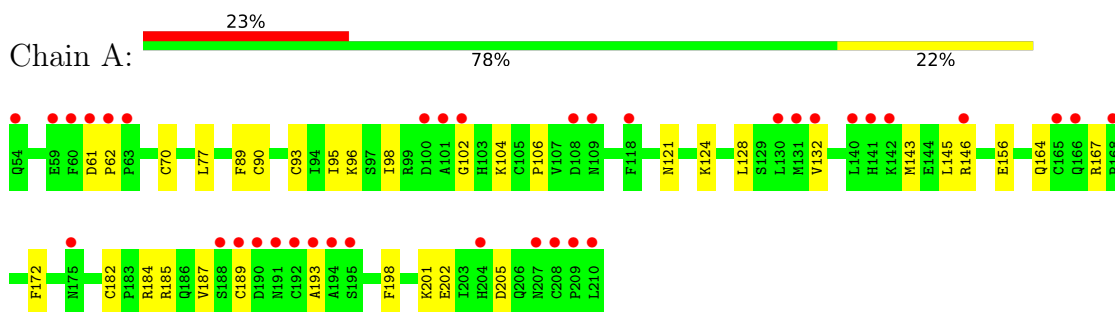
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	19	Total	O	0	0
			19	19		
3	B	27	Total	O	0	0
			27	27		

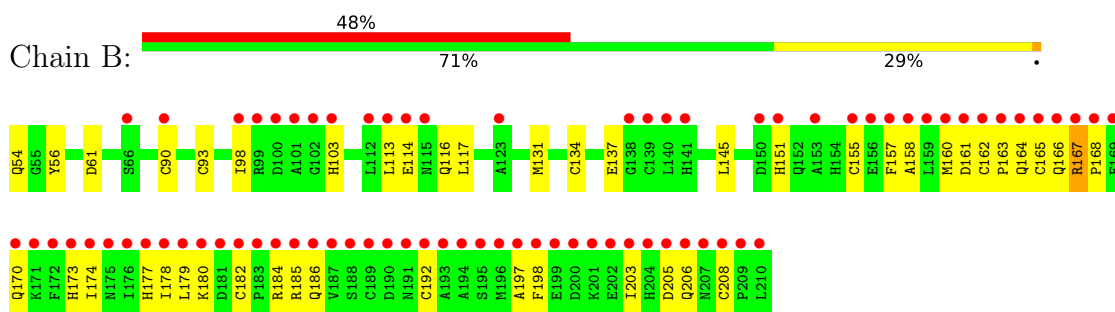
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: TNF receptor-associated factor 6



- Molecule 1: TNF receptor-associated factor 6



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	45.88Å 51.70Å 54.30Å 91.04° 112.15° 108.43°	Depositor
Resolution (Å)	6.00 – 2.60 6.00 – 2.60	Depositor EDS
% Data completeness (in resolution range)	98.5 (6.00-2.60) 98.5 (6.00-2.60)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.01 (at 2.58Å)	Xtrriage
Refinement program	PHENIX 1.20.1	Depositor
R, R_{free}	0.348 , 0.409 0.345 , 0.404	Depositor DCC
R_{free} test set	1215 reflections (10.08%)	wwPDB-VP
Wilson B-factor (Å ²)	39.4	Xtrriage
Anisotropy	0.156	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 72.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.76	EDS
Total number of atoms	2574	wwPDB-VP
Average B, all atoms (Å ²)	112.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 15.69% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.25	0/1288	0.45	0/1736
1	B	0.24	0/1288	0.48	0/1736
All	All	0.24	0/2576	0.47	0/3472

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1259	0	1207	32	1
1	B	1259	0	1207	44	1
2	A	5	0	0	0	0
2	B	5	0	0	0	0
3	A	19	0	0	18	1
3	B	27	0	0	18	1
All	All	2574	0	2414	76	2

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 15.

All (76) close contacts within the same asymmetric unit are listed below, sorted by their clash

magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:163:PRO:CA	3:B:402:HOH:O	1.85	1.23
1:B:166:GLN:NE2	3:B:402:HOH:O	1.82	1.10
1:B:163:PRO:HA	3:B:402:HOH:O	1.42	1.08
1:B:177:HIS:CE1	3:B:401:HOH:O	1.96	1.07
1:A:102:GLY:N	3:A:403:HOH:O	1.94	0.99
1:B:182:CYS:CB	3:B:412:HOH:O	2.12	0.96
1:B:163:PRO:O	3:B:402:HOH:O	1.84	0.96
1:A:98:ILE:N	3:A:402:HOH:O	1.90	0.94
1:B:182:CYS:HB2	3:B:412:HOH:O	1.71	0.87
1:A:102:GLY:CA	3:A:403:HOH:O	2.18	0.87
1:A:128:LEU:HB3	1:A:146:ARG:HG3	1.59	0.85
1:A:96:LYS:N	3:A:401:HOH:O	1.75	0.83
1:B:179:LEU:HD23	3:B:409:HOH:O	1.79	0.81
1:A:102:GLY:C	3:A:403:HOH:O	2.24	0.76
1:A:187:VAL:CG1	3:A:418:HOH:O	2.36	0.73
1:B:182:CYS:HB2	1:B:185:ARG:HB3	1.71	0.71
1:B:162:CYS:N	1:B:167:ARG:O	2.22	0.70
1:B:185:ARG:CA	3:B:412:HOH:O	2.39	0.70
1:B:185:ARG:HA	3:B:412:HOH:O	1.92	0.70
1:A:187:VAL:HG11	3:A:418:HOH:O	1.93	0.68
1:A:198:PHE:HB2	3:A:418:HOH:O	1.94	0.68
1:B:168:PRO:O	3:B:403:HOH:O	2.11	0.68
1:B:98:ILE:HG23	1:B:103:HIS:HA	1.75	0.67
1:A:95:ILE:N	3:A:401:HOH:O	2.27	0.67
1:B:161:ASP:HA	1:B:168:PRO:HA	1.77	0.66
1:A:189:CYS:O	1:A:193:ALA:N	2.29	0.66
1:B:90:CYS:HB2	1:B:93:CYS:SG	2.38	0.64
1:B:163:PRO:CB	3:B:402:HOH:O	2.33	0.63
1:A:198:PHE:HD1	3:A:418:HOH:O	1.81	0.63
1:B:164:GLN:OE1	1:B:186:GLN:NE2	2.31	0.63
1:A:90:CYS:HB2	1:A:93:CYS:SG	2.38	0.62
1:B:186:GLN:CD	3:B:410:HOH:O	2.37	0.61
1:A:95:ILE:CA	3:A:401:HOH:O	2.48	0.61
1:A:182:CYS:O	1:A:185:ARG:NE	2.33	0.60
1:A:167:ARG:NH1	3:A:406:HOH:O	2.39	0.56
1:B:205:ASP:HA	1:B:208:CYS:HB2	1.88	0.56
1:A:121:ASN:HA	1:A:124:LYS:HB3	1.88	0.55
1:B:178:ILE:HG22	3:B:409:HOH:O	2.07	0.54
1:B:185:ARG:HG2	1:B:198:PHE:HB2	1.90	0.54
1:A:104:LYS:HE2	1:A:106:PRO:HA	1.89	0.54
1:A:187:VAL:HG13	3:A:418:HOH:O	2.04	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:182:CYS:HB3	3:B:412:HOH:O	1.96	0.53
1:A:104:LYS:NZ	3:A:408:HOH:O	2.42	0.52
1:A:185:ARG:NH1	3:A:405:HOH:O	2.33	0.52
1:B:203:ILE:HA	1:B:206:GLN:HE22	1.73	0.52
1:B:134:CYS:SG	1:B:151:HIS:CD2	3.03	0.51
1:B:155:CYS:HB3	1:B:158:ALA:HB2	1.93	0.50
1:A:201:LYS:NZ	1:A:205:ASP:OD2	2.37	0.50
1:B:54:GLN:N	3:B:411:HOH:O	2.44	0.50
1:A:132:VAL:HG11	1:A:145:LEU:HD13	1.93	0.50
1:A:198:PHE:CD1	3:A:418:HOH:O	2.54	0.50
1:B:173:HIS:O	1:B:173:HIS:ND1	2.44	0.50
1:A:102:GLY:O	3:A:403:HOH:O	2.19	0.49
1:A:95:ILE:HB	3:A:401:HOH:O	2.13	0.49
1:B:180:LYS:HA	1:B:185:ARG:NH1	2.28	0.49
1:A:61:ASP:HB2	1:A:62:PRO:HD3	1.94	0.48
1:A:89:PHE:CZ	1:A:106:PRO:HD2	2.50	0.47
1:B:185:ARG:N	3:B:412:HOH:O	2.47	0.46
1:B:177:HIS:CE1	1:B:182:CYS:SG	2.82	0.46
1:B:170:GLN:O	1:B:174:ILE:N	2.49	0.46
1:B:56:TYR:CG	1:B:145:LEU:HD21	2.50	0.46
1:B:114:GLU:HA	1:B:117:LEU:HD12	1.99	0.45
1:B:164:GLN:HG3	1:B:178:ILE:HG23	1.98	0.44
1:B:173:HIS:HE1	1:B:177:HIS:HB2	1.82	0.44
1:B:137:GLU:O	1:B:157:PHE:HB3	2.18	0.44
1:B:160:MET:N	1:B:160:MET:SD	2.91	0.44
1:B:192:CYS:HB3	1:B:208:CYS:SG	2.58	0.43
1:B:184:ARG:CZ	1:B:197:ALA:HB2	2.49	0.42
1:B:174:ILE:O	1:B:178:ILE:HG13	2.19	0.42
1:A:164:GLN:HB3	1:A:184:ARG:HB2	2.02	0.42
1:B:116:GLN:HB3	3:B:405:HOH:O	2.19	0.41
1:A:143:MET:HB2	1:A:143:MET:HE2	1.99	0.41
1:B:178:ILE:HA	1:B:182:CYS:SG	2.61	0.41
1:B:61:ASP:O	1:B:131:MET:HB2	2.21	0.41
1:A:70:CYS:HB2	1:A:77:LEU:HD23	2.04	0.40
1:A:156:GLU:HB3	1:A:172:PHE:HB3	2.03	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:168:PRO:CG	3:A:403:HOH:O[1_665]	1.57	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:104:LYS:CD	3:B:414:HOH:O[1_445]	1.85	0.35

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	155/157 (99%)	149 (96%)	6 (4%)	0	100	100
1	B	155/157 (99%)	147 (95%)	8 (5%)	0	100	100
All	All	310/314 (99%)	296 (96%)	14 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	143/143 (100%)	142 (99%)	1 (1%)	84	94
1	B	143/143 (100%)	140 (98%)	3 (2%)	53	77
All	All	286/286 (100%)	282 (99%)	4 (1%)	67	85

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	202	GLU
1	B	113	LEU

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Mol	Chain	Res	Type
1	B	165	CYS
1	B	167	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 10 ligands modelled in this entry, 10 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	157/157 (100%)	1.51	36 (22%) 0 0	36, 69, 177, 317	0
1	B	157/157 (100%)	3.91	76 (48%) 0 0	35, 86, 324, 447	0
All	All	314/314 (100%)	2.71	112 (35%) 0 0	35, 73, 304, 447	0

All (112) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	165	CYS	22.9
1	B	208	CYS	17.1
1	B	193	ALA	13.6
1	B	189	CYS	12.3
1	B	192	CYS	12.2
1	A	192	CYS	12.0
1	B	169	PHE	12.0
1	B	176	ILE	11.9
1	B	160	MET	11.8
1	B	190	ASP	11.3
1	B	174	ILE	11.1
1	B	205	ASP	11.1
1	B	203	ILE	11.1
1	B	179	LEU	11.0
1	A	101	ALA	11.0
1	B	162	CYS	10.6
1	B	191	ASN	10.6
1	B	207	ASN	10.3
1	B	159	LEU	10.3
1	B	201	LYS	9.9
1	B	184	ARG	9.8
1	B	204	HIS	9.7
1	B	206	GLN	9.7
1	B	200	ASP	9.5

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Mol	Chain	Res	Type	RSRZ
1	B	170	GLN	9.4
1	B	178	ILE	9.3
1	A	208	CYS	9.1
1	B	194	ALA	9.1
1	A	62	PRO	9.0
1	B	155	CYS	8.7
1	B	197	ALA	8.7
1	B	196	MET	8.4
1	B	181	ASP	8.4
1	B	187	VAL	8.3
1	B	175	ASN	8.3
1	B	177	HIS	8.3
1	B	157	PHE	8.1
1	A	194	ALA	8.0
1	B	188	SER	7.9
1	B	202	GLU	7.9
1	B	158	ALA	7.8
1	B	182	CYS	7.8
1	B	113	LEU	7.7
1	B	199	GLU	7.6
1	B	171	LYS	7.6
1	B	163	PRO	7.5
1	B	138	GLY	7.5
1	B	209	PRO	7.3
1	B	210	LEU	7.2
1	A	100	ASP	7.1
1	B	185	ARG	6.9
1	B	164	GLN	6.6
1	B	141	HIS	6.6
1	B	180	LYS	6.5
1	B	139	CYS	6.0
1	B	161	ASP	5.9
1	A	190	ASP	5.5
1	B	166	GLN	5.5
1	B	173	HIS	5.5
1	A	61	ASP	5.4
1	B	195	SER	5.3
1	B	186	GLN	5.1
1	A	209	PRO	5.1
1	B	172	PHE	5.1
1	A	63	PRO	5.0
1	B	99	ARG	4.9

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Mol	Chain	Res	Type	RSRZ
1	B	101	ALA	4.9
1	A	189	CYS	4.6
1	B	183	PRO	4.6
1	B	167	ARG	4.3
1	B	198	PHE	4.3
1	A	166	GLN	4.1
1	A	195	SER	4.1
1	A	60	PHE	4.0
1	A	109	ASN	3.9
1	A	193	ALA	3.9
1	A	102	GLY	3.9
1	B	114	GLU	3.9
1	A	141	HIS	3.8
1	A	191	ASN	3.8
1	A	132	VAL	3.6
1	B	140	LEU	3.5
1	B	102	GLY	3.5
1	A	207	ASN	3.4
1	A	210	LEU	3.4
1	B	112	LEU	3.4
1	B	103	HIS	3.4
1	B	168	PRO	3.1
1	B	100	ASP	3.0
1	A	131	MET	2.9
1	A	140	LEU	2.7
1	B	66	SER	2.7
1	B	98	ILE	2.6
1	A	175	ASN	2.6
1	A	142	LYS	2.5
1	B	123	ALA	2.5
1	A	204	HIS	2.5
1	A	165	CYS	2.5
1	A	108	ASP	2.5
1	B	115	ASN	2.4
1	B	151	HIS	2.4
1	B	153	ALA	2.3
1	A	146	ARG	2.2
1	A	168	PRO	2.2
1	B	150	ASP	2.2
1	A	54	GLN	2.1
1	B	156	GLU	2.1
1	A	59	GLU	2.0

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Mol	Chain	Res	Type	RSRZ
1	B	90	CYS	2.0
1	A	118	PHE	2.0
1	A	130	LEU	2.0
1	A	188	SER	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

LIGAND-RSR INFOmissingINFO

6.5 Other polymers [i](#)

There are no such residues in this entry.